

Anterior Cruciate Ligament Reconstruction Progression Rehabilitation Program

By

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Case Study:

- 18 year old female soccer player
- Isolated ACL rupture (planted valgus force with rotation)
- No previous HX of knee injury
- Autograft B-T-B reconstruction

Long Term Goals:

- FWB and strengthening exercises by week 4
- Full ROM by week 6
- Maintain cardio
- Return to activity by week 9
- Restricted sport specific exercises by 4 months
- RTP 6 months

Short Term Goals:

- Decrease edema/effusion
- Decrease their pain
- Restore knee flexion 0°-90° within one week, while keeping full knee extension
- Active quadriceps control

Pre-rehabilitation

- Goals: to improve post-op function and decrease rehabilitation time
- Decrease effusion/edema – RICE, ESTIM (Interferential 20')
- Manage pain- NSAIDs (Anti-inflammatories, Acetaminophen Antibiotics and Anti-histamines, ICE)
- Maintain cardio through workouts on UEB
- Introduced THEREX to facilitate muscular contraction and for strengthening.
 - Quad Stets (2x10), Heel slides (2x10), Single Leg Raise (2x10)

Beginning Phase

Acute Phase Weeks 0-3

- **Goals**
 - 0°-90° flexion by end of week one
 - Decrease edema/effusion
 - Increase quadriceps strength
 - Increase hamstring strength

<p>Treatment</p> <ul style="list-style-type: none"> ○ NSAIDS: <ul style="list-style-type: none"> ▪ Anti-inflammatories, Acetaminophen Antibiotics and Anti-histamines ○ GameReady/ESTIM: <ul style="list-style-type: none"> ▪ IFC (Interferential 20') ○ RICE ○ Compression Sleeve ○ Joint Mobilizations: <ul style="list-style-type: none"> ▪ Grades I-II to decrease pain, Grades III-IV to restore motion, A/P, P/A ○ Effleurage: <ul style="list-style-type: none"> ▪ To decrease edema ○ U.S. Treatment <ul style="list-style-type: none"> ▪ Pulsed, 1-2mHZ, 5', 1.0 intensity 	<p>Exercises</p> <ul style="list-style-type: none"> ○ Quad sets <ul style="list-style-type: none"> ❖ 2x10 ○ SLR <ul style="list-style-type: none"> ❖ 2x10 ○ Towel slides <ul style="list-style-type: none"> ❖ 2x10' ○ Lunge Matrix <ul style="list-style-type: none"> ❖ 2x5 ○ Prone knee hangs <ul style="list-style-type: none"> ❖ 2x4'
	<p>Signs for Progression:</p> <ul style="list-style-type: none"> • No edema/effusion • Reduced pain • FWB • Full extension, 0°-120° of flexion

Repair Phase Weeks 4-6

- **Goals**
 - Full ROM
 - Increase hamstring/quad flexibility
 - WB exercises
 - Maintain cardio
 - Increase muscular endurance
 - Begin re-establishment of NMC
 - Gait control

<p>Treatment</p> <ul style="list-style-type: none">○ Continue U.S.<ul style="list-style-type: none">• Pulsed, 1-2 mHZ, 5', 1.0 intensity○ GameReady/ESTIM<ul style="list-style-type: none">• Elevated, 20', Russian to facilitate muscular contraction○ Joint Mobilizations/Patellar Tendon Mobilizations<ul style="list-style-type: none">• Grades I-II to decrease pain, Grades III-IV to restore motion, A/P, P/A○ Pain and Inflammation management as needed (NSAIDS)○ Medium to deep massage<ul style="list-style-type: none">• To break up adhesions and prevent scar tissue from laying down	<p>Exercises</p> <ul style="list-style-type: none">• Wall Squats<ul style="list-style-type: none">❖ 2x1'• Hamstring Curls on Ball<ul style="list-style-type: none">❖ 3x5• Step Ups<ul style="list-style-type: none">❖ 3x1'• Stool Walks<ul style="list-style-type: none">❖ 5 laps• SL Balance<ul style="list-style-type: none">❖ 3x 45"• BIODEX – LOS<ul style="list-style-type: none">❖ x2
<p>Signs for Progression</p> <ul style="list-style-type: none">• Restoration of strength, flexibility and ROM• Athlete confidence to progress• Pain free with exercises• Normal gait	

Cautious Phase

*** BE CAREFUL TO AVOID AGGRESSIVE REHAB DURING 7-8 WEEKS DUE TO AVASCULAR NECROSIS**

Goals:

- Avoid re-injury; avascular necrosis
- Increase balance, NMC, flexibility
- Return to activity by week 9
- Maintain cardio

<p>Treatment</p> <ul style="list-style-type: none"> ○ Medium to deep tissue massage <ul style="list-style-type: none"> • To break up adhesions and prevent scar tissue from laying down ○ ICE/ESTIM <ul style="list-style-type: none"> • Elevated, 20', IFC ○ Joint Mobilizations <ul style="list-style-type: none"> • Grades I-II to decrease pain, Grades III-IV to restore motion, A/P, P/A ○ Continue maintaining cardio ○ Introduce PNF patterns <ul style="list-style-type: none"> • D1, D2 	<p>Exercises</p> <ul style="list-style-type: none"> ○ Sun Salutation <ul style="list-style-type: none"> ❖ x5 ○ Warrior/Reverse Warrior <ul style="list-style-type: none"> ❖ x5 ○ Triangle <ul style="list-style-type: none"> ❖ x5 ○ Heel/Toe Walks on Airex Balance Beam <ul style="list-style-type: none"> ❖ 3 laps ○ BIODEX-LOS <ul style="list-style-type: none"> ❖ x2 ○ DL Airex Balance (Eyes Closed) <ul style="list-style-type: none"> ❖ 2x30'
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***Return to normal progression once 8 weeks is over**

Middle Phase

Remodeling Phase Weeks 9-16

Goals:

- Leg strength within 85% of contralateral leg
- Maintain cardio
- Begin eccentric loading and plyometrics exercises
- Restore athlete's confidence

<p>Treatment</p> <ul style="list-style-type: none"> • ICE/ESTIM <ul style="list-style-type: none"> • Elevated, IFC, 20' • Foam Roller <ul style="list-style-type: none"> • *Go after hamstrings and quads • True Stretch <ul style="list-style-type: none"> • *Go after hamstrings and quads • Massage if needed 	<p>Exercises</p> <ul style="list-style-type: none"> ○ Bosu Lateral Hops, Bowler Squat <ul style="list-style-type: none"> ❖ 2x20 ○ Jump Rope <ul style="list-style-type: none"> ❖ 2x2' ○ Ladders <ul style="list-style-type: none"> ❖ X2' ○ Box Jumps <ul style="list-style-type: none"> ❖ 2x15 ○ DL Squat on Bosu <ul style="list-style-type: none"> ❖ 2x15
<p>Signs for Progression</p> <ul style="list-style-type: none"> • Functional testing without pain 	

Final Phase

Months 5-6

Goals

- Sport specific exercises done without pain
- Regain strength/coordination
- Sport specific skills at pre-injury level
- RTP

<p>Treatment</p> <ul style="list-style-type: none">○ ICE/ESTIM<ul style="list-style-type: none">• IFC, ICE○ Foam Roller○ True Stretch○ Massage if needed	<p>Treatment</p> <ul style="list-style-type: none">○ “V”-Run with Pass<ul style="list-style-type: none">❖ x5○ Box Run<ul style="list-style-type: none">❖ x5○ Resistance Cord<ul style="list-style-type: none">❖ 3 laps○ Hurdles with Header<ul style="list-style-type: none">❖ x3○ “W”- Run with Dribble<ul style="list-style-type: none">❖ x5○ Give-N-Go/Crossing Drill<ul style="list-style-type: none">❖ x10
<p>Return to Play Criteria</p> <ul style="list-style-type: none">• No joint effusion• Full ROM• 85-100% strength compared to contralateral leg• Ligament Stability (KT2000 if available)• Functional Testing	

Exercises Weeks 0-3

Quad Sets (2x10)

Isometric contraction of quads with knee in full extension



Straight Leg Raise (2x10)

Back against the wall, contract quads to initiate extension of knee and leg



Towel Slides (2x10')

Active knee flexion until end range of motion, then passively pull with towel



Prone Knee Hangs (2x4')

Knee extension in prone position, with ankle weight around foot to regain extension



Lunge Matrix 2x5

Assisted lunges with TRX, range of motion depends on athlete's pain tolerance



Exercises Week 4-6

Wall Squats (2x1')



Back against the wall, knees bent with in pain free ranges. To progress, hold a weight while holding the squat.

Step Ups (3x1')



Step on box while raising arms and opposite knee. To progress, add medicine ball to lift above head.

Hamstring Curls on Ball (3x5)



Place feet on top of ball and raise hips to be parallel with the rest of the body. Straighten legs while keeping hips up.

Stool Walks (5 laps)



Use stool to assist walking.

Exercises Weeks 4-6 Cont.

SL Balance (3x45")



Balance by standing on one foot. First progression is a single leg balance on airex. Second progression is to balance on both legs on a BOSU ball. Third progression is to balance on a single leg on the BOSU ball.

BIODEX- LOS (x2)



Follow instructions on BIODEX to measure the stability of the lower extremity.

Exercises Weeks 7-8

Sun Salutation (x5)



Stand straight with arms above head. Reach forward while keeping the back straight. Reach forward toward the ground. Walk hands forward. Straighten body and bend arms to a 90-degree angle. Turn toes under and push the body up by straightening arms.

Warrior/ Reverse Warrior (x5)



In a wide stance, raise hands above head. Then Turn toward the center while lowering arms. Reach Back and raise opposite arm.

Triangle (x5)



Reach one arm toward the front leg. Switch arms.

**Exercises
Weeks 7-8 Cont.**

**Heel/ Toe Walks on Airex Balance Beam
(3 Laps)**



Walk on beam on toes. Then walk only on heels.

**DL Airex Balance
(eyes closed)
(x2)**



Stand on AIREX with both feet and eyes closed. To progress this, Stand on one leg with eyes closed.

Exercises Weeks 9-16

BOSU Lateral Hops, Bowler Squat
(2x20)



Stand on one leg bringing the other leg behind and to the side while hopping. To progress this, complete the same exercise on a BOSU ball.

Jump Rope
(2x2')



Jump rope for two minutes. Progress this by jumping on one foot.

Box Jumps
(2x15)



Start on the ground and tuck knees to chest while jumping on the box.

Exercises Weeks 9-16 Cont.

DL Squats On BOSU
(2x15)



Squat with two legs on BOSU. Progress to single leg. Next progression is a double leg squat with the BOSU upside down. The complete same exercises with a single leg.

Ladders
(x2')

Have the patient do different variations of ladders for two minutes



BIODEX- LOS
(x2)



Follow instructions on BIODEX to measure the stability of the lower extremity.

Exercises Months 5-6

Give N' Go Drill (x10)

*Have someone put pressure behind the patient
Pass the ball to the patient; have them turn on
opponent and dribble*



Box Run (x5)

*Sprint to first cone, side shuffle to the next cone,
back peddle to the next cone, side shuffle to next
cone again.*



Crossing Drill (x10)

*Have the patient dribble the ball, then
decelerate and cross the ball*



"W" Run (x5)

*Set up the cones in the shape of a W,
dribble to the first cone, then back
peddle to the next cone, and repeat.*



Exercises Months 5-6

Resistance Cord Run

(x3)

Strap cord around yourself and a partner and have them resist you as you run



"V" Run with Pass (x5)

Set up cones in a V pattern. Have the patient sprint to the cone and pass them the ball. Then have them back peddle to the next cone and repeat.



Hurdles with a Header

(x3)

Set up hurdles in a line, have patient jump over them keeping knees together and feet together, then having them do a header at the end.

